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FILE 'CA' ENTERED AT 09:21:06 ON 14 MAY 2003

L1 136220 S THERMOG? OR ACOUSTIC(1A)PYROMET? OR LITEOFF OR LITOFF OR LIGHTOFF OR
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OR DETERMIN?)
L2 6830 S L1 AND CATALY?
L3 13 S ACOUSTIC(1A)PYROM?
L4 89 S ACOUSTIC(3A)TOMOG?
L5 0 S L4 AND CATALY?
L6 7 S L4 AND (CONTACT? OR NONCONTACT?)
L7 545 S L2 AND (ACTIVITY OR EFFICACY OR POISON? OR CONVERSION) (7A) (DETECT? OR
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ANALY? OR ASSES? OR ESTIMAT? OR EVALUAT? OR COMPAR? OR SENSE# OR
SENSING OR IDENTIF? OR PROBE# OR PROBING OR EXAMIN? OR CHECK? OR
QUANTIF? OR QUANTITAT?)
L8 565 S L3,L6-7
L9 330 S L8 NOT PY>1996
L10 8 S L8 AND PATENT/DT NOT L9 AND (1997 OR 1998)/PY
L11 3 S L8 AND PATENT/DT NOT L9 AND PY<1997
L12 338 S L9-11
L13 329 S L12 NOT (FUEL CELL OR POWERPLANT OR CYCLO OLEFIN OR ANTIKNOCK OR
CHAR)
L14 328 S L13 NOT PLASTIC PACKAGE

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L14 ANSWER 22 OF 328 CA COPYRIGHT 2003 ACS

AN 125:65996 CA

TI Yttria-stabilized zirconia supported copper oxide catalyst. II. Effect of
oxygen vacancy of support on catalytic activity for CO oxidation

AU Dow, Wei-Ping; Huang, Ta-Jen

CS Dep. Chem. Eng., Natl. Tsing Hua Univ., Taichung, 300, Peop. Rep. China

SO Journal of Catalysis (1996), 160(2), 171-182

AB CuO was supported on yttria-stabilized zirconia (YSZ) and γ -alumina, resp.,
using impregnation methods. The supported CuO catalysts were characterized
by temp.-programmed redn. The catalytic activity of CuO supported on YSZ
for CO oxidn. was measured and compared with those supported γ -alumina and
with com.- γ -alumina supported precious metals (PMs) (i.e., Pd and Pt).
Results of the activity tests indicated that CuO/YSZ catalysts can exhibit
PM-like behaviors such as the light-off characteristic and the hysteresis
phenomenon but CuO/ γ -alumina catalysts cannot do so. The significant and
conspicuous activity enhancement of the YSZ-supported CuO has been ascribed
to the modification of reaction mechanism due to the surface O vacancy of
YSZ. An active center composed of an interfacial Cu⁺ and a surface O
vacancy of YSZ and formed by an interfacial metal oxide-support interaction
is proposed to explain the activity enhancement. These interfacial active
centers could provide a 2nd reaction pathway for CO oxidn. via the
so-called metal-support interfacial reaction step, for which the turnover
frequency is much higher than that of redox cycle mechanism operated on the
CuO/ γ -alumina catalyst. These interfacial active centers can be destroyed
by Cl addn. due to blocking of the surface O vacancies of YSZ by the
strongly adsorbed Cl. The reaction mechanism and catalytic behavior of
PM/ γ -alumina, CuO/ γ -alumina, and CuO/YSZ catalysts are compared and
discussed.

L14 ANSWER 34 OF 328 CA COPYRIGHT 2003 ACS

AN 124:236827 CA
TI Applications of the thermogravimetric analysis in the study of fossil fuels
AU Huang, He; Wang, Keyu; Wang, Shaojie; Klein, M. T.; Calkins, W. H.
CS Dept Chemical Engineering, University Delaware, Newark, DE, 19716, USA
SO Preprints of Papers -American Chemical Society, Division of Fuel Chemistry
(1996), 41(1), 1-7

AB Development and applications of the thermogravimetric techniques in the authors' lab. are reported in terms of characterization of coal structure, detg. the liquefaction conversion and measuring the rate of the retrograde reactions occurring during coal liquefaction, evaluating the thermal and catalyzed hydroprocessing of the coal derived resids, and detg. the boiling range of liq. fuels. Various effects including the thermogravimetric operating variables, such as heating rate, purge gas type, gas flow rate, and modification of the thermogravimetric sample pan as well as a method for the development of a custom built thermogravimetric system are also discussed.

L14 ANSWER 38 OF 328 CA COPYRIGHT 2003 ACS

AN 124:95881 CA

TI Kinetic analysis of the ignition characteristics of diesel particulates
AU Zhang, Guanglong; Liang, Lunhui; Chen, Jiahua; Zhao, Xiuren
CS Dalian University of Technology, Peop. Rep. China
SO Society of Automotive Engineers, [Special Publication] SP (1994), SP-1050, 137-43

AB The catalytic conversion of diesel exhaust particulates (DEP) is studied. The oxidn. catalysts, carried by γ -Al₂O₃ pellets, are prepd. by impregnation. By use of thermogravimetric anal. (TGA) technique, the catalytic properties of these catalysts are studied and the igniting characteristics of DEP are detd. A math. method is introduced to process TGA exptl. data. Equations are derived to evaluate the kinetic parameters of the oxidn. of DEP. By comparing the activation energy of the reaction and the ignition temp. of DEP, the catalytic activities of the oxidn. catalysts are evaluated.

L14 ANSWER 40 OF 328 CA COPYRIGHT 2003 ACS

AN 124:64955 CA

TI Development and application experience of diesel catalytic converters
AU Zhang, Guanglong; Liang, Lunhui; Chen, Jiahua; Zhao, Xiuren
CS Dalian University of Technology, Peop. Rep. China
SO Society of Automotive Engineers, [Special Publication] SP (1994), SP-1050, 145-53

AB Several different catalyst were fabricated and evaluated using thermogravimetric anal. and DTA. Three types of catalytic converters were developed. Engine bench tests on these converters loaded with selected catalysts were made. Testing procedures included conversion rate of toxic gases; redn. effect of exhaust smoke; resistant performance of converters and their influences on the engine, etc. Finally, the most effective catalytic converter was installed on a forklift truck for testing and durability examn. Testing results show that the catalytic converter has higher conversion rate for gaseous emissions, esp. for CO and NOx. After two months running, the conversion rates basically kept the original level. Also, because of special considerations in the converter structure design, it shows some effects on the redn. of diesel exhaust smoke and noise. So it can meet the special needs of the forklift truck working in closed area, such as ship depository.

L14 ANSWER 46 OF 328 CA COPYRIGHT 2003 ACS

AN 123:320999 CA

TI Redox activity of nonstoichiometric cerium oxide-based nanocrystalline catalysts
AU Tschope, Andreas; Liu, Wei; Flytzani-Stephanopoulos, Maria; Ying, Jackie Y.
CS Dep. Chem. Eng., Massachusetts Inst. Technol., Cambridge, MA, 02139, USA
SO Journal of Catalysis (1995), 157(1), 42-50
AB Nonstoichiometric CeO₂-based catalysts were studied for SO₂ redn. by CO to elemental S, CO oxidn., and complete CH₄ oxidn. Nanocryst. processing by inert gas condensation was exploited for its unique potential to generate nonstoichiometric highly dispersed oxides. Nanocryst. CeO₂-x materials, pure or doped with 10 at.% La or 15 at.% Cu, were generated by magnetron sputtering from pure or mixed metal targets, followed by controlled oxidn. These materials allowed us to investigate the effects of oxide nonstoichiometry and dopants on catalytic activity in oxidn. reactions. The nonstoichiometric materials were characterized by X-ray diffraction, N₂-adsorption porosimetry, and XPS. Catalytic properties were studied in a packed-bed reactor and compared to materials of similar compn. prepd. by copptn. In general, the nonstoichiometric CeO₂-based materials exhibited greater catalytic activity than pptd. ultrafine materials. The light-off temps. for SO₂ redn. by CO, CO oxidn., and CH₄ oxidn. were 100-180° lower for the nanocryst. pure and La-doped CeO₂-x catalysts than for the resp. pptd. materials. The Cu-doped form of both types of catalysts possessed comparable activity. The nonstoichiometric materials did not show a hysteresis behavior in the activity profile for SO₂ redn. by CO, unlike the pptd. catalysts. They further demonstrated a remarkable stability against CO₂ poisoning in this reaction. The differences between the nanocryst. and the pptd. materials are discussed in terms of the stoichiometry of these oxide catalysts.

L14 ✓
AN ANSWER 47 OF 328 CA COPYRIGHT 2003 ACS
123:207489 CA

TI Catalytic purification of car exhaust over cobalt-and copper-based metal oxides promoted with platinum and rhodium
AU Lin, P.-Y.; Skoglundh, M.; Loewendahl, L.; Otterstedt, J.-E.; Dahl, L.; Jansson, K.; Nygren, M.
CS Department of Engineering Chemistry, Chalmers University of Technology, Goteborg, S-412 96, Swed.
SO Applied Catalysis, B: Environmental (1995), 6(3), 237-54
AB A total of 25 alumina- and silica-supported, oxide-based catalysts were prepd., with the overall metal compn. La_{0.45}Sr_{0.15}Ce_{0.35}Zr_{0.05}M_{1.0} (M = Co or Cu) and promoted with 0-0.5 mg Pt-Rh/g catalyst. These catalysts were evaluated with respect to light-off temps. and redox characteristics, using NO/CO/C₃H₆/O₂/N₂ gas mixts. to simulate car exhaust. Activities for complete oxidn. of propene and CO increased with increasing content of metal oxides and noble metals. Catalysts were characterized by X-ray powder diffraction (XRD), SEM, transmission electron microscopy (TEM) combined with energy-dispersive spectroscopy (EDS) anal., temp.-programmed redn. (TPR), and sp. surface area measurements (BET). SEM/TEM/XRD showed the alumina-supported catalysts contained well dispersed oxides of the added elements, whereas the silica-supported catalysts contained significantly larger particles of the Cu or Co oxides. TPR peak for redn. of Co oxide shifted toward lower temps. with increasing content of Pt-Rh, indicating H spill-over from the noble metals to the Co oxide. The catalytic activity of the Co-based oxides supported on alumina and promoted with 0.49 mg Pt-Rh/g catalyst was comparable to the activity of a com. 3-way catalyst (TWC), contg. >4 times as much Pt-Rh.

B10 QD505. A604.3
L14
AN ANSWER 53 OF 328 CA COPYRIGHT 2003 ACS
123:64427 CA

#55
TI Acoustic tomography for three dimensional temperature and CO₂-concentration measurements of environmental fields
AU Zhu, Ning; Kato, Seizo; Maruyama, Naoki; Ito, Nobutaka
CS Mie Univ., Tsu, Japan
SO Nippon Kikai Gakkai Ronbunshu, B-hen (1995), 61(583), 1122-7
LA Japanese
AB Noncontact and nondestructive measurements for detg. temp. and CO₂-conc. distribution in environmental fields are under investigation by acoustic tomog. A new method to reconstruct the 3-dimensional temp. and CO₂-conc. distributions from the projected ultrasonic phase differences is proposed in this paper. A set of programs to evaluate the projected data is made and a numerical reconstruction process is also offered. An exptl. system consisting of several pairs of ultrasonic sensors is established to apply the new method to axisym. temp. and CO₂-conc. fields. The temp. profiles reconstructed by the present acoustical tomog. agree well with the results of the thermocouple measurements. As a result, the procedure proposed in this paper is verified to be reasonable.

124 ANSWER 60 OF 328 CA COPYRIGHT 2003 ACS

AN 122:223770 CA

TI Structure and reactivity of copper-zinc-cadmium chromite catalysts

AU Castiglioni, G. L.; Vaccari, A.; Fierro, G.; Inversi, M.; Lo Jacono, M.; Minelli, G.; Pettiti, I.; Porta, P.; Gazzano, M.

CS Dipartimento di Chimica Industriale e dei Materiali, Universita di Bologna, Viale del Risorgimento 4, Bologna, 40136, Italy

SO Applied Catalysis, A: General (1995), 123(1), 123-44

#55
AB Different mixed oxides contg. Cu, Zn, Cd and Cr were obtained by heating hydroxycarbonate precursors at various temps. and in different atmospheres, and characterized by using x-ray diffraction (XRD), IR, diffuse reflectance spectroscopy, thermogravimetry, and BET and copper surface area anal. The redn. process and the phase evolution during redn. of the mixed oxides was followed by temp.-programmed redn. and XRD. The mixed oxides were activated in an H₂/N₂ flow and then tested as catalysts in the vapor-phase hydrogenation of γ -butyrolactone (GBL) and a soln. of maleic anhydride (MA) in GBL (60:40 wt./wt.). Depending on compn., heating temp. and atm., the samples contained different phases, such as CuO, CdO, Cr₂O₃, CuCrO₂, CuCrO₄, α -CdCrO₄, cubic and tetragonal CuCr₂O₄, and cubic Cu-Zn and Cu-Cd spinel-type phases. The partial substitution of Cu²⁺ ions with Zn²⁺ or Cd²⁺ ions stabilizes the cubic form of the spinel-type phases, which form via intermediate chromate phases. The final product of redn. in all cases is metallic copper. Cubic CuCr₂O₄ is more reducible than the corresponding tetragonal phase, which reduces to metallic copper through the intermediate formation of CuCrO₂. The presence of zinc or cadmium promotes or inhibits, resp., the copper reducibility both in CuO and in the copper chromite spinel. In the hydrogenation of GBL, the Cu/Cr catalysts obtained by calcination show similar behaviors, with a small increase in activity as a function of the copper content. At the lower temps. investigated the main products are THF and n-butanol, while at 548 K significant amts. of ethanol are obsd., favored by increasing copper content. On the other hand, the Cu/Cr catalyst obtained by heating under a reduced oxygen atm., for which only tetragonal CuCr₂O₄ is detected before redn., shows a decrease in catalytic activity. Partial substitution of the Cu²⁺ ions gives rise to a decrease in GBL conversion, with a considerable deactivation when Cd²⁺ ions are present. Decreasing the H₂/C₄ molar ratio gives rise to a decrease in activity for all samples, without any significant change in the trend obsd. With the MA/GBL soln., the partial substitution of Cd²⁺ ions for Cu²⁺ ions also gives rise to considerable deactivation. For the other catalysts, the main products at the lower temps. are GBL and succinic anhydride (SA),

while at 548 K overhydrogenation and hydrogenolysis reactions predominate. The presence of Zn^{2+} ions gives rise to an increase in yield in GBL, due to an increase in the hydrogenation activity toward SA, but the consecutive transformation of GBL at high temp. to low cost byproducts is not inhibited. On the other hand, the presence in the Cu/Cr catalyst of only $CuCr_2O_4$ increases the yield in GBL, as a consequence of a strong inhibition of the overhydrogenation and/or hydrogenolysis reactions of GBL. With the MA/GBL soln., similar behaviors are obsd. when the H_2/C_4 molar ratio decreases. At the same time, however, the lack in the carbon balance increases and a displacement towards high temp. of the max. yield in GBL is found.

- L14 ANSWER 62 OF 328 CA COPYRIGHT 2003 ACS
AN 122:113943 CA
TI Catalytic combustion of mixed waste: catalyst research and fluidized bed reactor development
AU Baldwin, R. M.; Gaur, S.; Adams, J.; Gordon, M. J.; Hill, R. R.; Knecht, R. D.; Golden, J. O.; Stiefvater, S.; Roecker, B.; et al.
CS Chem. Engineering and Petroleum and Refining Dep., Colorado Sch. Mines, Golden, CO, USA
SO Therm. Treat. Radioact., Hazard. Chem., Mixed, Munitions, Pharm. Wastes, Proc. Int. Incineration Conf., 13th (1994), 359-64 Publisher: Univ. Calif., Irvine, Irvine, Calif.
AB The Colorado School of Mines has been carrying res. aimed at developing a low-temp. fluidized bed reactor and catalyst/sorbent system that will be suitable for vol. redn. of mixed wastes. Res. is focused into two areas: 1) modeling of hydrodynamics and mixing characteristics of a two-dimensional fluidized bed cold flow unit; 2) fluidized bed combustion catalysts and sorbent systems. The modeling studies are being conducted based on data obtained from a full-two-dimensional bubbling bed unit and on a hybrid bubbling bed/entrained flow two-stage recirculating cold flow unit (under construction). Catalyst res. is being carried out using a thermogravimetric analyzer and a 2.54 cm (ID) quartz tube lab. fluidized bed reactor system. An online mass spectrometer is used for speciation of reaction product gases. A suite of catalysts including bulk metal oxides and supported mater. are currently being evaluated for low-temp. combustion activity under both reducing (redox mechanism) and oxidizing conditions. Use of sodium carbonate as an in-situ sorbent for HCl is also being investigated to eliminate the need for a wet scrubber system on the combustion reactor. This paper will discuss results and progress to date in the evaluation of alternate combustion catalysts and modeling of plastics pyrolysis rate data.

- L14 ANSWER 72 OF 328 CA COPYRIGHT 2003 ACS
AN 121:183183 CA
TI Use of a Novel Short Contact Time Batch Reactor and Thermogravimetric Analysis To Follow the Conversion of Coal-Derived Resids during Hydroprocessing
AU Huang, He; Calkins, William H.; Klein, Michael T.
CS Department of Chemical Engineering, University of Delaware, Newark, DE, 19716, USA
SO Industrial & Engineering Chemistry Research (1994), 33(10), 2272-9
AB The conversion of two coal-derived nondistillable residues in Tetralin during hydroprocessing was examd. in a novel lab.-scale batch reactor at up to 540° and 17 MPa under well-defined contact times from a few seconds to >30 min. Thermogravimetric analyses, augmented by gas chromatog. and gas chromatog./mass spectrometry, were used to follow the course of the conversion. Two residues, one derived from Wyodak subbituminous coal and
- W416 TP 1.1533

another from Pittsburgh bituminous coal, differed in their reactivity toward conversion to sol. or lower-boiling materials. In the absence of a catalyst, the insol. residues became solubilized in Tetralin to some degree. However, even at long reaction times and high temps., there was no indication of a breakdown in mol. wt. or mol. structure. In the presence of a presulfided Ni-Mo/Al₂O₃ catalyst, there was a much higher degree of solubilization and a definite indication of mol. breakdown.

L14 ANSWER 74 OF 328 CA COPYRIGHT 2003 ACS

AN 121:118588 CA

TI Catalytic decomposition of potassium chlorate

AU Cannon, J. C.; Zhang, Y. C.

CS Puritan-Bennett Corp., Lenexa, KS, 66215, USA

SO Journal of Thermal Analysis (1994), 41(5), 981-93

AB Thermal decompn. of potassium chlorate in the presence of various additives is studied using thermogravimetric anal. and differential thermal anal. Catalytic effects of metal oxides with comparable surface areas are compared, and the catalytic effects of a no. of nonoxide additives are also studied. The nonoxide additives show catalytic activities similar to the corresponding metal oxide. Metal cations and their electron configurations det. the catalytic activity of various compds. Metal cations with partially filled d shells have the highest activity, transition metal cations with completely empty d orbitals are moderately active, and metal cations with completely filled d shells or noble gas configurations have min. activity.

L14 ANSWER 76 OF 328 CA COPYRIGHT 2003 ACS

AN 121:87195 CA

TI Evaluation of some cobalt and nickel based perovskites prepared by freeze-drying as combustion catalysts

AU Kirchnerova, J.; Klvana, D.; Vaillancourt, J.; Chaouki, J.

CS Dep. Chem. Eng., Ec. Polytech., Montreal, H3C3A7, Can.

SO Catalysis Letters (1993), 21(1-2), 77-87

AB A series of cobalt and nickel based perovskite type catalysts with high sp. surface area (8-20 m²/g) was prepd. by spray-freezing/freeze-drying method. The catalytic activity of all samples in methane combustion was evaluated by measuring the light-off temp., the conversion at 823 K and the temp. of the end of the reaction. The exptl. data suggest higher activity than reported in literature for similar or other perovskites, and confirm its strong dependence on the sp. surface area. Among eleven tested catalysts, including seven new compns. four of which showed excellent activity, La_{0.66}Sr_{0.34}Ni_{0.3}Co_{0.7}O₃ was the best performing.

L14 ANSWER 90 OF 328 CA COPYRIGHT 2003 ACS

AN 120:115507 CA

TI Spatially resolved effects of deactivation on field-aged automotive catalysts

AU Smedler, Gudmund; Lundgren, Staffan; Romare, Anders; Wirmark, Goeran; Jobson, Edward; Hoegberg, Erik; Weber, Kurt H.

CS Technol. Dev. Dep. App. Phys., AB Volvo, Swed.

SO Society of Automotive Engineers, [Special Publication] SP (1991), SP-863 (Worldwide Emission Control Advancements), 23-37

AB Four samples from each of two field-aged catalysts subjected to different field test conditions were investigated. The light-off and conversion performance of each sample was measured in a synthetic exhaust flow reactor system. Time-resolved laser IR spectroscopy was used to investigate the catalyst behavior under transient conditions. Significant differences in light-off temps. and transient conversion performance between the samples

was obsd. The samples taken from the inlet side of the monolith were more deactivated than the corresponding ones from the outlet. However, samples taken from peripheral positions always showed better performance than samples originating from the center. In order to explain obsd. variations in activity, the following surface properties were examd.: oxygen uptake, specific metal area (CO chemisorption), total surface area (BET) and chem. compn. (XPS anal.). It was concluded that thermal deactivation was mainly responsible for the difference between peripheral and central positions while the poisoning due to S, Pb and P had the largest effect on the inlet samples. The total conversion efficiency, as measured by FTP75 tests, was compared to the results from lab. activity tests and catalyst characterization data. The mechanisms of ageing and the effect on emissions were correlated to the lab. results from this study.

LN ANSWER 102 OF 328 CA COPYRIGHT 2003 ACS

AN 118:216076 CA

TI Evaluation of modes of catalyst deactivation by coking for cumene cracking over zeolites

AU Bellare, A.; Dadyburjor, D. B.

CS Dep. Chem. Eng., West Virginia Univ., Morgantown, WV, 26505-6101, USA

SO Journal of Catalysis (1993), 140(2), 510-25

AB The const.-coke Arrhenius plot technique was used to assess the relative magnitudes of the possible modes of catalyst deactivation (i.e., suppression of active sites or by choking of pores) using reaction expts. under process conditions. For cumene cracking over rare earth Y zeolite, thermogravimetry was used as a continuous-flow microreactor to monitor coke levels, with activity measured by online gas chromatog. Using modifications described for small-pore catalysts, both temp. and coke levels influence the relative importance of site suppression and pore choking in the deactivation of the zeolite. At relatively high temps., site suppression was predominant at all coke levels studied here. At lower temps., pore choking is more important at low levels of coke formation, with site suppression increasing in importance at the higher coke levels. The results are consistent with a phys. model developed.

LN4 ANSWER 123 OF 328 CA COPYRIGHT 2003 ACS

AN 115:236101 CA

TI Catalytic effects of metals on peat combustion

AU Aho, Martti J.; Hamalainen, Jouni P.; Tummavuori, Jouni L.

CS Combust. Therm. Eng. Lab., Tech. Res. Cent. Finland, Jyvaskyla, 40101, Finland

SO Fuel (1991), 70(10), 1143-5

AB Combustion of peat, evaluated in an entrained-bed flow reactor in the presence of 100-200 mmol/kg metals (with higher and lower concns. for Fe), showed an order of catalyst reactivity of $\text{Cr} > \text{Mn}, \text{Fe} > \text{Co}, \text{Ni} > \text{Ca} > \text{Zn}, \text{Mg} > \text{Al}$; particle heating rates were $15,000 \pm 5000$ deg/s. In the presence of 100 mmol/kg Cr, the combustion time decreased by 26% (compared with acid-washed peat); the lowest decrease was 4% with Al. The order of catalytic activity, detd. by thermogravimetry at 0.17 deg/s heating rate, was $\text{Fe}, \text{Cr} > \text{Mn}, \text{Ni} > \text{Co} > \text{Ca} > \text{Mg} > \text{Zn} > \text{Al}$. An increase in Fe concn. from 105-330 mmol/kg showed little effect, but a decrease to 42 mmol/kg weakened the activity markedly. The best transition metal catalysts had 5-6 electrons in d orbitals; metals contg. completely occupied or empty orbitals, or those with only 1 stable oxidn. state, are poor catalysts. For dried Finnish bog peat, the catalytic activity of cations are mainly due to Fe because of the low content of other strong catalyst (Cr, Mn). Ca caused some addnl. effects.

main TP 315, F85

L14 ANSWER 125 OF 328 CA COPYRIGHT 2003 ACS
AN 115:116759 CA
TI Novel catalytic materials for methane activation and selective oxidation of hydrocarbons
AU Schwank, J.
CS Dep. Chem. Eng., Univ. Michigan, Ann Arbor, MI, USA
SO Report (1990), GRI-90/0177; Order No. PB90-270380, 19 pp. Avail.: NTIS
From: Gov. Rep. Announce. Index (U. S.) 1990, 90(23), Abstr. No. 060,489
AB The selective oxidn. of CH₄ (and its prior activation) to formaldehyde was investigated. Oxide catalysts were prepd. and tested for their ability to catalyze the selective oxidn. of CH₄. These catalysts were characterized by variety of phys. and chem. methods including surface area measurements, thermogravimetry, IR, x-ray diffraction, neutron activation anal., anal. and high-resoln. electron microscopy, photoelectron spectroscopy, isotope exchange of O between the gas phase and the solid phase, and elec. cond. measurements. The catalytic activity was assessed in a flow reactor operated under differential reaction conditions. Product anal. was performed by gas chromatog. and gas chromatog./mass spectrometry. To develop a better mechanistic understanding of CH₄ activation kinetics, kinetic simulations were carried out. The predictions derived from computer modeling were then verified exptl.

Bionic
L14 ANSWER 145 OF 328 CA COPYRIGHT 2003 ACS
AN 110:64394 CA
TI Studies on the promotion of nickel-alumina coprecipitated catalysts. II. Lanthanum oxide
AU Lansink Rotgerink, H. G. J.; Paalman, R. P. A. M.; Van Ommen, J. G.; Ross, J. R. H.
CS Fac. Chem. Technol., Univ. Twente, Enschede, 7500 AE, Neth.
SO Applied Catalysis (1988), 45(2), 257-80
AB Two series of La promoted Ni-Al₂O₃ catalysts were prepd. by copptn. of the metal nitrates. The molar ratio between Ni and Al + La was kept const. at 2.5 or 9.0 within each series. The calcination and redn. of these samples were studied by thermogravimetry and their structures before and after calcination and redn. were examd. by x-ray diffraction. The methanation activities of the final catalysts were detd. by differential scanning calorimetry. The methanation of CO over Ni-Al₂O₃ catalysts is enhanced by the presence of La₂O₃. With low percentages of La, the promoter is built into the precursor structure during the copptn. process. This is a metastable situation; phase sepn. occurs during hydrothermal treatment. In both series there was an optimum amt. of La at which the activity per g of Ni reached a max. The optimum specific activity of a La promoted Ni-Al₂O₃ catalyst was twice as large as that of the unpromoted material. Above these optimum values, the activity per g of Ni decreased because of 2 effects: an increase in the Ni particle sizes and an increase in the amts. of K remaining from the pptn. step. Al₂O₃ is needed to stabilize the Ni crystallites against sintering. The promoting action of La₂O₃ is slightly higher after redn. at 400° than after redn. at 600°. La increased the amt. of CO which was adsorbed slowly; the amt. of CO which was rapidly adsorbed, however, was not altered. The increase in activity was accompanied by an increase in the apparent activation energy.

L14 ANSWER 147 OF 328 CA COPYRIGHT 2003 ACS
AN 109:92121 CA
TI Preparation of chromium tungstate catalysts and their behavior toward methanol
AU Popov, T.; Ivanov, K.; Krustev, S.
CS Dep. Chem., Higher Inst. Agric. "V. Kolarov", Plovdiv, Bulg.

SO Heterogeneous Catalysis (1987), 6th, Pt. 2, 315-20
AB All catalyst specimens studied were obtained by the pptn. method by mixing aq. solns. of $\text{Cr}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$ and $\text{Na}_2\text{WO}_4 \cdot 2\text{H}_2\text{O}$ at 20-88°. Their phase compn. was detd. with a diffractometer by $\text{CoK}\alpha$ radiation. DTA and thermogravimetric analyses were performed. Catalytic activity and selectivity were tested in MeOH oxidn. Samples of compn. $\text{Cr}_2(\text{WO}_4)_3 + \text{WO}_3$ possessed the highest activity and selectivity.

LI4 ANSWER 150 OF 328 CA COPYRIGHT 2003 ACS

AN 108:227474 CA

TI Influence of the starting aluminum salt on the surface and acid properties of aluminum phosphate catalysts precipitated with ammonium hydroxide

AU Campelo, J. M.; Garcia, A.; Luna, D.; Marinas, J. M.

CS Fac. Sci., Univ. Cordoba, Cordoba, E-14004, Spain

SO Journal of Catalysis (1988), 111(1), 106-19

AB The influence of the starting Al salt (Cl^- , NO_3^- , or SO_4^{2-}) and the pretreatment temp. (773-1273 K) on textural properties, crystal structure, and surface acidity of AlPO_4 ($\text{Al/P} = 1$) catalysts was studied. The catalysts were characterized by using N adsorption, x-ray diffraction, IR spectroscopy, and thermogravimetric analyses. The surface acid properties were detd. by using a dynamic method that consists of detg. the catalytic activity in cyclohexene skeletal isomerization (CSI), a reaction that requires the presence of strong surface acid sites. Significant differences in structure, texture, surface acidity, and catalytic activity in CSI were found, showing that the Al starting salt plays an important role in the final properties of AlPO_4 catalysts. $\text{Al}(\text{NO}_3)_3$ yielded materials with higher surface area and low activity for CSI while $\text{Al}_2(\text{SO}_4)_3$ resulted in higher surface acidity and catalytic activity for CSI although the sample was highly cryst. with low surface area. AlCl_3 produces porous catalysts although they are less acidic.

LI4 ANSWER 156 OF 328 CA COPYRIGHT 2003 ACS

AN 108:8160 CA

TI Quantification of flow hydrodynamics in pulse thermogravimetric analysis systems

AU Dadyburjor, D. B.; Dean, J. W.

CS Dep. Chem. Eng., West Virginia Univ., Morgantown, WV, 26506, USA

SO AIChE Journal (1987), 33(11), 1829-34

main TPL: AB A test is presented for comparing flow hydrodynamics in different thermogravimetric anal. (TGA) systems used as pulse microreactors. The test involves passing a pulse of injectant over the sample pan contg. an adsorbent. Water and zeolite are used in the present case. The technique is easily performed and is insensitive to variations in temp. A model is developed by which the fraction of the gas pulse bypassing the sample pan within the TGA can be obtained. In gas/solid reactions, either catalytic or noncatalytic, the test should prove useful for comparing TGA extent-of-conversion data to similar measurements taken from other reactor configurations, carrier flow rates, and flow geometries.

LI4 ANSWER 162 OF 328 CA COPYRIGHT 2003 ACS

AN 106:70107 CA

TI Method and process for determination of catalyst activity

IN Schoedel, Rainer; Keck, Michael; Neumann, Ulrich

PA VEB Leuna-Werke "Walter Ulbricht", Ger. Dem. Rep.

SO Ger. (East), 3 pp.

PI DD 234942 A1 19860416

DD 1985-273634 19850228

PRAI DD 1985-273634 19850228

AB Catalyst activity is routinely, rapidly, and accurately monitored in a

sampling-testing system in which 3-5 samples, contg. 0.05-2 g catalyst each, are heated sep. and simultaneously in a radiation oven, sep. 2-30 L/h gas flows (contg. reactants and withdrawing products) are passed through the samples, and the products are withdrawn and sep. injected for anal.; each sample has a sep. temp.-measuring element and the temp. of each sample can be independently controlled and monitored by a rotating dial. Thus, 3 samples (contg. 200 mg each) of a Pt/Al₂O₃ alkane reforming catalyst were reduced in H and tested for reforming of heptane (at 1.15 g/g catalyst-h flow); the 3 samples had heptane conversions and yields of arom. hydrocarbons of 46.4 ± 0.7 and 22.9 ± 0.4 , 28.7 ± 0.9 and 12.4 ± 0.2 , and 36.9 ± 0.8 and 23.5 ± 0.4 mol%.

L14 ANSWER 167 OF 328 CA COPYRIGHT 2003 ACS

AN 105:233027 CA

TI The effect of Ni-Al ratio on the properties of coprecipitated nickel-alumina catalysts with high nickel contents

AU Lansink Rotgerink, H. G. J.; Bosch, H.; Van Ommen, J. G.; Ross, J. R. H.

CS Dep. Chem. Technol., Twente Univ. Technol., Enschede, 7500 AE, Neth.

SO Applied Catalysis (1986), 27(1), 41-53

AB A series of Ni-Al₂O₃ catalysts with a Ni/Al ratio of 3-20 was prep'd. by copptn. The calcination and redn. of these samples were studied by thermogravimetry and their structures exam'd. by x-ray diffraction. The methanation activities of the final catalysts were det'd. by differential scanning calorimetry. Whereas the Al₂O₃ present in the samples with Ni/Al = 3 stabilizes the catalysts against cryst. growth during both calcination and redn., the effect is much less pronounced with higher Ni contents. The resultant catalysts for Ni/Al = 6, 9, and 20 had activities comparable with those with Ni/Al = 3 as long as the calcination and redn. were carried out at relatively low temps. A model of the catalysts is proposed.

L14 ANSWER 169 OF 328 CA COPYRIGHT 2003 ACS

AN 105:227384 CA

TI The determination of catalytic activity of various metallic compounds in the polycondensation of bis(hydroxyethyl) terephthalate using DSC and TG techniques

AU Gamlen, G. A.; Shah, T. H.; Bhatti, J. I.; Dollimore, D.

CS Dep. Chem. Appl. Chem., Univ. Salford, Salford, M5 4WT, UK

SO Thermochimica Acta (1986), 106, 105-13

AB The catalytic activities of various metal compds. in the polycondensation of bis(hydroxyethyl) terephthalate (I) to poly(ethylene terephthalate) [25038-59-9] were investigated by thermogravimetric anal. and DSC. The peak max. of the reaction peak in the DSC test (T_{max}) gave values which corresponded well with the temp. at which the initial mass loss was obs'd. in TG expts. (T₀). A comparison of T_{max} and T₀ at a fixed concn. with conventional methods showed good agreement. The order of catalytic activity obtained using both techniques was Zn(OAc)₂ [557-34-6] > Bu₂SnO [818-08-6] > Sb₂O₃ > K Ti oxalate [14481-26-6] > Ge glycolate [105585-41-9]. The effect of the concn. of various catalysts on the polycondensation of I was also investigated. These observations agreed with data obtained by conventional methods but the techniques used here were more convenient.

L14 ANSWER 184 OF 328 CA COPYRIGHT 2003 ACS

AN 103:110714 CA

TI A rapid method for catalyst testing. Zeolite catalysts for methanol conversion to hydrocarbons

AU Piven, A. P.; Echevskii, G. V.; Leonov, V. E.; Ione, K. G.

CS Inst. Catal., Novosibirsk, USSR

SO Reaction Kinetics and Catalysis Letters (1985), 27(1), 71-5

AB A rapid method for testing catalysts is suggested, permitting a 30-fold redn. in the time of their examn. The method is recommended for studying catalytic processes taking place with either evolution or absorption of heat.

L14 ANSWER 219 OF 328 CA COPYRIGHT 2003 ACS

AN 92:220154 CA

TI Exhaust gas catalytic reduction of nitrogen oxides over iron nickel oxide (NiFe₂O₄)-chromium nickel oxide (NiCr₂O₄) solid solutions

AU Courty, P.; Raynal, B.; Rebours, B.; Prigent, M.; Sugier, A.

CS Res. Lab., Inst. Fr. Pet., Rueil-Malmaison, 92506, Fr.

SO Industrial & Engineering Chemistry Product Research and Development (1980), 19(2), 226-31

AB The catalytic redn. is described of NO_x in exhaust gases over mixed NiFe_{2-x}Cr_xO₄ oxides in bulk state or deposited on a pelletized α -Al₂O₃ carrier. Initial activity tests (lab. or motor-bench tests) indicate a better activity and selectivity for the ternary Fe₂O₃-Cr₂O₃-NiO oxide, when compared with the 3 binary combinations FeCr, FeNi, CrNi oxides). The effect of compn. variations on catalytic properties of the ternary mixed oxide were studied. The mechanism of aging was investigated for the NiFe₂/3Cr₃/4O₄ compn. by thermogravimetric anal., x-ray diffraction, and activity tests after aging; aging is probably due to chem. reactions between the α -Al₂O₃ carrier and the Ni contained in the ternary oxide. This reaction is enhanced when the engine exhaust gases contain the most residual O and can be prevented by adding precious metals to the base oxide formula.

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AN 87:54929 CA

TI Block multichannel single-row reactor of ideal displacement

AU Korneichuk, G. P.; Stasevich, V. P.; Girushtin, G. G.

CS Inst. Fiz. Khim. im. Pisarzhevskogo, Kiev, USSR

SO Kinetika i Kataliz (1977), 18(1), 244-7

LA Russian

AB A continuous, plug-flow reactor was designed for detg. catalyst activity and the kinetics of heterogeneous catalytic reactions. The reactor is formed of 7 exchangeable capsules made of a material that is inert to the reacting medium and has high heat resistance. The capsules fit into a longitudinal channel. Inside the capsule, grains of the catalyst and of a heat carrier are placed alternately. The channel dimensions are 2.5 x 2.5 mm. The app. is sealed by ground covers of the top and bottom faces made of stainless steel, fastened by a spring to the cool part. The temp. is detd. at 6 points along the contacting bed length. At these points, compn. is detd. also. The obtained concn. gradients, using the plug-flow model, enable detg. the type of the kinetic equation. The app. is of a universal type. Only capsules with different catalyst grain sizes are exchanged during measurements.

L14 ANSWER 254 OF 328 CA COPYRIGHT 2003 ACS

AN 82:174711 CA

TI Microactivity test measuring low temperature activity of auto exhaust catalysts

AU Carlson, D. W.; Chu, P.; Dwyer, F. G.

CS Res. Dep., Mobil Res. Dev. Corp., Paulsboro, NJ, USA

SO Preprints-American Chemical Society, Division of Petroleum Chemistry (1973), 18(3), 467-76

AB A micro-activity test is described in which differential thermal anal. is used to evaluate rapidly the ability of an auto exhaust catalyst to

main micro
7690-41 95

initiate and sustain combustion of a synthetic exhaust mixt. The study shows the flexibility of the test in that it provides direct comparison of exptl. catalysts with inert stds., std. catalysts, or other exptl. catalysts. Data are presented that demonstrate the capabilities of the test, the limitations of the test, and the hazards of over-interpretation of test results.

LY4 ANSWER 259 OF 328 CA COPYRIGHT 2003 ACS

AN 81:5879 CA

TI Poisoning by sulfur oxides of some base metal oxide auto exhaust catalysts
AU Farrauto, R. J.; Wedding, Brent

CS Res. Dev. Lab., Corning Glass Works, Corning, NY, USA

SO Journal of Catalysis (1974), 33(2), 249-55

AB Many base metal oxide catalysts used for CO and hydrocarbon oxidn. in automobile exhaust gas are poisoned by S oxides. A study was made of SOx interaction with several catalysts (Cu chromite, Cu oxide, Co oxide, and com. Cu chromite contg. Cu oxide) to det. its effect on catalytic activity. Various techniques were used in concert and included ir spectroscopy, thermogravimetric anal., differential scanning calorimetry as a measure of catalytic activity, and chem. anal. The catalytic activity was detd. as a function of the amt. of SO2 adsorption at various temps., and the sp. surface sites were identified. The results indicated that there are at least 2 different adsorption sites for SO2 on Cu chromite; the SO2 adsorbs preferentially on the site most important for CO oxidn.; the sites necessary for hydrocarbon oxidn. being less affected. No sulfate ions form on stoichiometric Cu chromite, in contrast to the other catalysts studied. The extent of regeneration of poisoned catalysts depends on the catalyst compn., and several regeneration methods are discussed.

L14 ANSWER 262 OF 328 CA COPYRIGHT 2003 ACS

AN 78:147265 CA

TI Selection of catalysts by thermogravimetry

AU Scheve, J.; Heise, K.

CS Zentralinst. Phys. Chem., Dtsch. Akad. Wiss., Berlin-Adlershof, Ger. Dem. Rep.

SO Therm. Anal., Proc. Int. Conf., 3rd (1972), Meeting Date 1971, Volume 3, 71-82. Editor(s): Wiedemann, Hans G. Publisher: Birkhaeuser, Basel, Switz.

AB Thermogravimetric anal. was used for rapid testing of ammoxidn. catalysss for propene. Catalyst activity depended on wt. loss due to dehydration of surface at 150-250°. The results were explained by the nature and concn. of OH species on the catalyst surface.

LA4 ANSWER 277 OF 328 CA COPYRIGHT 2003 ACS

AN 70:92908 CA

TI Determination of metallic nickel in catalysts and ceramic materials by differential thermal analysis

AU Macak, Jiri; Malecha, Jiri

CS Inst. Chem. Technol., Prague, Czech.

SO Analytical Chemistry (1969), 41(3), 442-6

AB A reliable D.T.A. method is presented for evaluating Ni catalysts contg. 0-10% Ni on refractory supports. This method det. the temp. difference between the reactor for catalytic reactions and that with inert SiO2 packing (quartz glass) when both are placed in an accurately temp.-controlled metal block. A gas mixt. contg. first, the reducing and then the oxidizing gases passes through both reactors (quartz glass) under equal conditions of time and flow. It is possible on the basis of the amt. of heat evolved as indicated by D.T.A., to det. not only the catalytic activity of the investigated sample but also the amt. of the catalytically

active metallic Ni. The present paper offers an application of this method to studying the steam reforming of hydrocarbons.

~~114~~ ANSWER 302 OF 328 CA COPYRIGHT 2003 ACS

AN 62:90198 CA

OREF 62:16035g

TI A thermographic method for the evaluation of the activity of copper catalysts for the synthesis of methyl alcohol

AU Kotowski, Wlodzimierz

CS Chem. Werken, Oswiecim, Pol.

SO Zeitschrift fuer Analytische Chemie (1965), 209(3), 409-12

AB Differential thermal analysis of Cu-Zn-Al oxide catalysts for MeOH synthesis shows that active catalysts show one or more endothermal peaks. Unsatisfactory products show an exothermal peak.

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